

F
392
R5P7



BANCROFT
LIBRARY



THE LIBRARY
OF
THE UNIVERSITY
OF CALIFORNIA

Tay

Poston



AN OLD EL PASO LANDMARK—POSTON'S CAMP, 1856.



EL PASO STREET, IN 1886.



NEW COURT HOUSE BUILDING, EL PASO, TEXAS.



PASO DEL NORTE—MEXICAN SIDE.



VALLEY SCENE NEAR EL PASO—ON THE RIO GRANDE.

PRICE, ONE DOLLAR.

IRRIGATION

BY

CHARLES D. POSTON,

LATE COMMISSIONER OF THE UNITED STATES

in Asia.

Ex-Delegate in Congress from Arizona,

Ex-Superintendent of Indian Affairs,

Ex-Register of the Land Office,

Ex-Consular Agent at Nogales,

Ex-Military Agent at El Paso,

Etc., Etc., Etc.

AUTHOR OF

"EUROPE IN THE SUMMER TIME," "THE SUN WORSHIPPERS OF ASIA,"

"APACHE LAND," ETC., ETC.

CHICAGO :

THE J. M. W. JONES STATIONERY AND PRINTING COMPANY.

1887.

F392
R5 P7

Entered according to Act of Congress, in the year 1887, by CHARLES D. POSTON, in the office
of the Librarian of Congress, Washington, D. C.

IRRIGATION.

IRRIGATION existed in Egypt before the pyramids were erected. It has fed the millions of Asia since the creation of the world. It nurtured Rome into existence, and was practiced in America before Columbus discovered the New World, and yet the people of the United States east of the Mississippi river know but little about it—and care less.

The Moors introduced irrigation into Spain, and the Spaniards imported an imperfect system of irrigation into Mexico, Texas, California, etc. The Valley of the Nile has yielded its fruitful abundance from irrigated lands for countless ages, and Cato wrote learnedly advocating its introduction into Italy; but the greatest achievement of modern times has been the improvement of the system of irrigation in the East Indies, by the British Government of India. Irrigation in the East Indies antedates all history; the Great Mogul gave it a grand impetus during the magnificence of his reign.

When the British Government (after the Sepoy mutiny) took over the control of more than two hundred and fifty millions of subjects in India, the first duty of Statesmanship was to provide labor and food for the people, and this has been accomplished by the extension of a system of irrigating canals unequalled in the world. Famine in India is rendered impossible, as long as the Himalayas give their melted snows to fructify the Indian valleys. The Ganges Canal, with its branches, is three thousand five hundred miles long.

Among other duties in the service of the Government of the United States, it was a pleasure, nearly twenty years ago, to investigate and report upon the system of irrigation throughout ASIA; and in this service I learned much in Japan, China, India, Persia, Arabia and Egypt; and subsequently observed much on the subject in Italy and Spain. In California as early as 1850, it gratified a youthful curiosity to follow the irrigating ditches which those primitive people had made, and subsequently the grand irrigating canals in Arizona and Northern Mexico excited a lively interest in a lost and perished race, who have left little or no other evidence of their existence upon earth.

It was my fortune, or misfortune, to traverse the Rio Grande nearly a third of a century ago, where I found a thriftless, lazy class of people basking in the opulence of eternal sunshine, and deriving their meager

subsistence from the richest soil in the world, by the most primitive methods of agriculture, and when I left the Rio Grande in May last, there was scarcely a perceptible improvement in agriculture. The people are too lazy to turn over in bed—and with a soil that will produce onions, emitting no more smell than a turnip, I will solemnly swear that they were *importing onions from Spain*.

While the people of California have built an empire on the Pacific, which is the admiration of the world—and the Great West goes marching on—the people on the Rio Grande plough with a stick, dig fuel with a hoe, and cut hay with an axe. *They irrigate nothing but their throats*. In fact, since enterprising people have built railroads to their doors, they have *ceased producing anything, and import everything*. The advance in real estate enables them to occupy a fundamental position—waiting for strangers to come along and buy lots. The grapes of the Rio Grande are of a different quality and flavor from those grown elsewhere, and what little wine they make is consumed with avidity in the Valley. They have ceased to grow wheat, and import flour. (They used to sell flour to the Government at 12½ cents per pound.)

WATER, WATER, EVERYWHERE! AND NOT A DROP TO

IRRIGATE.

The greatest prerequisite to success in agriculture, fruit raising, etc., in the Western States and Territories, is water. A constant and abundant supply of water is the true key to Western progress and development. In nearly all of that country the rainfall is totally insufficient, and not to be relied upon; hence Western people have been forced to study the problem of irrigation. Having been forced to look into this question, we naturally try to trace up its origin and history.

The system found in California and in this country has been bequeathed to us by Mexico, and was inherited by them from Spain. Looking farther back, we find that it was one among the many good gifts which the Moors gave to Spain when they overran that country in the eighth century. Whether the Moors obtained it direct from the Arabs, or took it from the Egyptians, we are unable to determine at this late day. But in inquiring after its still more ancient origin and source, we must not stop this side of the valleys of the Euphrates and Tigris. If we start here, in the dim and shadowy ages of antiquity, beyond which even tradition becomes unintelligible, we will find that, with few exceptions, the highest types of civilization and the brightest examples of progress and prosperity have been located, sustained and nurtured by systems of irrigation.

ANCIENT IRRIGATION.

The glory, grandeur and wealth of royal Babylon, of Nineveh, Thebes, Bagdad, Cairo and Memphis, around which, as common centers, the civilization of great periods of time hung and radiated, were all attributable to and dependent upon the agricultural perfection surrounding them, and made possible by IRRIGATION. We might go further, and say that it has been the support and sustenance of the civilized world long after the cessation of Roman sway. For none will fail to recognize that the Nile country alone supported what was known as the Roman world, and that Egypt was always regarded as the granary of the empire. The Egyptian people were overthrown and vanquished, but their system of irrigation survived and gave sustenance to Roman civilization, and remained intact throughout all the vicissitudes and changes. If anything, irrigation was better in the days of Semiramis than in the days of Boabdil, although, like the other concomitants of the beautiful Alhambra, orchards, vineyards and meadows, as then seen along the banks of the Guadalquivir, speak of a splendid development, both material and intellectual. The Moors obtained from their Arab progenitors a taste for astronomy and some inclination toward practical mathematics, and to some extent we find applied mathematics in its crude state assisting in making large portions of their country bloom and blossom as the rose by the ingenious devices which the Moors had of supplying water to the gardens, orchards, vineyards and beautiful meadows which dotted old Hispania during their occupancy.

It is a fact which cannot be controverted, that after the reconquest of Spain and the expulsion of the Moriscoes, Spain began to decline. The splendid schools of Granada, and the numerous manufactories of Valencia and other places gradually faded away and left Spain without any support, save that which she gathered by the sword, for she had neglected almost entirely her irrigation system; and the apology for one which we have, and which was found in California when that State was acquired, is the system handed down by the successors of those Spaniards who vanquished and expelled the Moriscoes from Spain.

PROGRESS REQUIRED.

It is my purpose now to show the inadequacy of this system, and the present results of it, as compared with the capabilities and possibilities of a new system which the progressive American demands and will have. We have touched but very briefly upon its antiquity, for the reason that four-fifths, we might even say nine-tenths, of English-speaking people are

practically unacquainted with this system. Their civilization, comparatively speaking, is in its infancy; it is still jejune, and has grown up in a climate of moisture and regular rainfall, and operating upon what might be termed virgin soil, and until recently the people of the United States had no necessity of irrigation. But times are changing, and the time will come when four-fifths of the population of America may be dependent upon irrigation in their agricultural pursuits. Then, we say, we will do well to look into this question, and when the American idea once takes hold of it, systems new and prolific will evolve wonderful results.

Having brought the reader down to the consideration of this point, we make the broad statement that the results of irrigation in California, Colorado, Arizona and New Mexico show, in a large majority of instances, an increase of one hundred per cent. over results dependent upon rainfall alone in the Eastern and Middle States. The history of the West proves this statement to be correct. This once admitted, then in the valley of the Rio Grande the soil, the climate and the water must cause the reader to stop and investigate, with renewed and eager interest, the conditions and statements which are placed before them.

THE AMERICAN NILE.

Our Rio Grande is the American Nile. The similarity is complete—the analogy remarkable. The Nile has its source in the interior of Africa, in the lakes of Herodotus, of Livingston and of Stanley, the Alps of Abyssinia, many of which are covered in their winter time by heavy masses of snow. The lower portions of the great plateau are visited during April by perfect deluges of rain, such as only tropical countries can produce. The accumulation of these torrential rains, and the melting of the Alpine snows, causes the river to rise with almost clock-like regularity between the first and fifth days of May, and by the end of that month it is booming and bank full. The turbid floods go tearing their way through rough defiles and deep canons that fissure a volcanic country, the formation of which, travelers tell us, is very much like that of Colorado, with limestone, granite, and occasional vast trachyte formations predominating. The waters become thoroughly charged with a combination of mineral ingredients, which contain in themselves all the elements of fertility. When the turbid floods reach the great valley of Nubia and Egypt they are of a slimy consistence, and about the beginning of June, just before the annual planting time begins in that country, they commence to overflow their banks and spread over the valley lands, which have been in a state of cultivation ever since Abraham's time, and probably long before.

Whatever the crops of the preceding year may have abstracted from the soil is more than restored by the abundant deposit of fertile mud which the river leaves behind when its period of boom is over. The lands are found covered with a crust of stiff slime, containing lime, potash, chlorides, ammonia, and various other valuable ingredients. Into this rich slime the Egyptian fellah casts his seed, and in an incredibly short time, with scarcely any cultivation, and only such subsequent and additional irrigation as the reservoirs filled during the river's rise will allow, he reaps more than an hundred fold. No manure is ever applied, but the soil is constantly getting richer, and bears at the present day, after a thousand years of neglect and mismanagement, better crops than in the days of the Pharaohs and Ptolemies.

THE RIO GRANDE.

High up on the interior plateau of Southern Colorado, in the legendary country of San Juan, among wild crags and heaven-aspiring battlements covered with eternal snow, rises the Rio Grande, or as the Spaniards, who must have seen it first some time in May or June, 1538, called it the Brave River of the North. It rises in the great porphyritic formation of the San Juan, near Ouray and Lake City, and is fed by the immense snow masses that almost constantly cover that inhospitable country. It tears its way out like a young giant, grinding the rocks to pieces as it goes along, and becomes surcharged with their mineral constituents, identically the same that the waters of the Nile contain, and only adding an immense quantity of aluminoid detritus, which makes it muddier even than the Missouri itself. The similarity of the chemical constituents of the two kinds of water has often been noted by scientific travelers and experts. Both, after being allowed to settle, show a liquid of limpid purity, and of remarkably pleasant taste and wholesome character. But in their native turbulency, both are equally muddy, and leave the same thick sediment of slimy mud behind, after their waters recede from an overflow. This takes place with our Rio Grande usually in May and June, when the immense snow masses of the San Juan country begin to melt. Then the river plays some fantastic pranks, occasionally overflowing its banks from foot-hill to foot-hill.

These amiable eccentricities will have to be curbed when the population of the valley becomes denser and more Americanized. Judicious rip-rapping at exposed angles, and a general planting of the banks with willows and Bermuda grass, and the building of the great canal, will prevent overflows except by means of the irrigating channels.

This annual rise of our Rio Grande begins at the very time when irrigation becomes necessary—immediately when ready for the plough and the seed. It continues during June and July, and usually lasts long enough to tie on to the rainy season of July and August.

The system of ditches is at present badly planned and very inadequate for the purpose intended. The acequia madre which supplies Paso del Norte with water, is about as good a specimen of an irrigating ditch, planned and executed by Mexican labor only, as we can find in the valley. There is at present scarcely any systematic attempt along the whole course of the river, from the northern boundary of New Mexico down to where the cañon country below the mouth of the Concho River commences, to construct suitable dams below the points where it is intended to take out acequias, and thus obtain a full head and a constant supply of water at a comparatively trifling expense. All these points will come to be better understood and executed after a while, when a pushing and energetic American population occupies the valley and converts its fertile but now unused lands into vineyards and orchards.

The construction of a great irrigating canal, such as is in contemplation at the present time, demands naturally a large outlay of labor and material. To repay this outlay, all the waters so taken out must be used to advantage, and large tracts of land must thus become dependent upon the one great canal. No single farmer, and no single neighborhood, can undertake such a task.

THE CANAL.

This canal once constructed, every acre within the valley will become a vineyard, an orchard, or a meadow. All the idle water which flows wastefully to the Gulf, will be made to yield the greater part of its wealth of plant food which it holds in suspension, and we will no longer witness this great volume of water running past our doors while our ditches are dry, when they should be full to overflowing.

The flow of water in the Rio Grande is ample for the needs of the valley. The opportunity is here offered to the capitalist to make a profitable investment in an enterprise which will give a richer return than can be found elsewhere in this country. The cost of a canal a distance of fifty miles has been estimated to be approximately \$250,000. There would be tributary to such a canal some 150,000 acres of valley land, ready for cultivation as soon as water can be obtained. Every acre of this land would then contribute to the canal company a yearly stipend of say one dollar per acre for water privileges, which would insure to the investors a net income of about \$100,000 per annum. These facts and figures

can be verified by personal investigation. Capital is now, for the first time in years, beginning to look to the Southwest, and with restored confidence and abundant crops there is no point in the West which will command that attention which the valley of the Rio Grande will command in the near future.

STATISTICAL AND SCIENTIFIC.

If the reader is not deterred by a few dry facts and prosaic figures, he will find it profitable to follow me with due patience a little while longer.

In a general way, the limit of agriculture, without irrigation, is indicated by the curve of 20 inches rainfall, and where the rainfall is equally distributed throughout the year, this limitation is without exception. But in certain districts the rainfall is concentrated in certain months, so as to produce a "rainy season," and wherever the temperature of the rainy season is adapted to the raising of crops, it is found that farming can be carried on with even a little less than 20 inches of annual rain. This, however, holds good only in certain portions of the United States. Nowhere in Texas are 20 inches of rain sufficient for agriculture, while in Dakota and Minnesota a much less amount is sufficient.

The annual rainfall in El Paso, as ascertained by a series of observations for a number of years (over twenty), has been found to be 8.53 inches. This precipitation is distributed generally in the following ratio: Spring, 0.43 inches; summer, 3.49 inches; fall, 3.38 inches; winter, 1.23 inches. Thus at a glance will be seen the utter hopelessness of carrying on agriculture of any kind in this section of country without artificial irrigation.

In comparison with the 8.53 inches of annual rainfall at El Paso, we find 31.30 inches at San Antonio, 27.58 at New Braunfels, 33.52 at Austin, and 22.61 inches even at Fort Clark. At all of these places "dry farming" can be carried on, and ordinarily with profit and a reasonable share of certainty. But there will be occasional droughts or cloud-bursts, and sometimes a whole season's hard labor is lost to the patient husbandman, without a particle of fault on his part. But how does the farmer, gardener and orchardist stand in districts depending upon irrigation?

ADVANTAGES OF IRRIGATION.

Crops cultivated by irrigation are not subject to the vicissitudes of rainfall. The farmer fears no droughts; his labors are seldom interrupted, and his crops are rarely injured by storms. The immunity from drought and storms renders agricultural operations much more certain and profitable than in regions of greater humidity. Again, the water comes down

from the mountains and plateaus freighted with fertilizing materials derived from decaying vegetation and the soils of the upper regions, which are spread by the water used in irrigation over the cultivated lands.

It may safely be anticipated that all the lands redeemed by irrigation in the Rio Grande valley, will be highly cultivated and abundantly productive, and agriculture will be but slightly subject to the vicissitudes of scant and excessive rainfall. A stranger entering this region for the first time is apt to conclude that the soil is sterile, because of its chemical composition, but experience demonstrates the fact that all the soils are suitable for agricultural purposes when properly supplied with water. Altogether the fact suggests that far too much attention has heretofore been paid to the chemical composition of soils, and too little to those physical conditions by which moisture and air are supplied to the roots of the growing plants.

PRACTICAL AND THEORETICAL DETAILS.

The unit of water employed in irrigating enterprises in the West is usually the inch,—meaning thereby the amount of water that will flow through an orifice one inch square. But in practice this quantity is very indefinite, due to the “head,” or amount of pressure from above; in some districts this latter is taken at six inches. Another source of uncertainty exists in the fact that increase in the size of the orifice and increase in the amount of flow do not progress in the same ratio. An orifice of one square inch will not admit of a discharge one-tenth as great as an orifice of ten square inches. An inch of water, therefore, is variable with the size of the stream as well as with the head or pressure. With the influx of Americans into the Rio Grande Valley, it will become necessary to adopt a more definite mode of measuring irrigating water. In measuring the volume of water which is carried down by a stream, it is usual to state the number of cubic feet which the stream will deliver per second.

This matter—ascertaining the amount of water flowing down the Rio Grande at different seasons of the year—is one of exceeding importance in estimating the agricultural capacities of the valley, and it is unfortunate that the task has never been performed in a thorough and systematic manner. Some very valuable estimates of the volume of water in the river were made some thirty years ago, when the first official boundary line between the two republics was run by Emory; but as they were made at only one particular stage of the river, and did not extend over the full period of the year, their value in an investigation of this subject is only accidental. Then again at Del Norte, not far from the headwaters of the

river, observations were made by the Powell Geological Survey which were more systematically conducted, and extended over the different seasons of the year, thus making them of some practical utility for the agriculture of Colorado. But the case is so entirely altered away down at El Paso, that we have practically no accurate observations to guide us in our examination here. This is greatly to be regretted; without these data we can only approximately deal with the irrigation problem.

In determining the amount of water carried by any particular stream which can be utilized for irrigating purposes, Powell has already pointed out that this quantity is variable in each stream from season to season and from year to year. He long ago pointed out that the irrigable season is but a portion of the year. To utilize the entire annual discharge of a river, it would be necessary to hold the surplus flowing in the non-growing season, in large reservoirs. But as such a disposition of the waters of the Rio Grande will be a matter of the undetermined future, the question of immediate practical importance is resolved into a consideration of the amount of water that it will afford during the irrigating season.

In May, June and July the volume of water in the river near El Paso will average three hundred feet in width and five in depth, with a velocity of five miles an hour; in August, September and October it will average one hundred feet in width and two and a half to three feet in depth, with a velocity of two and a half miles per hour. When considered that by the end of July the requirements of irrigation for fruits is over, there will then be more than a sufficiency for the late vegetable and alfalfa crops.

It must not be forgotten that the composition of the soil throughout the Rio Grande Valley is such that the subsoil will hold water for weeks and even months, and gradually yields the absorbed moisture to the overlying soil by slow upward percolation, or capillary attraction, during the season when the growing crops require its fertilizing effects.

The foregoing remarks are necessarily of a merely desultory character. The subject of irrigation is among Americans a comparatively new one, and no great stock of reliable information can be presented.

EL PASO.

Any one can see by what is commonly called "a glance at the map" that nature made EL PASO a pivotal point on the Continent, and it was very kind of nature to do so, as man has done but little. There are six or seven thousand people there, revelling in the luxury of a real estate

"boom," without any *local resources* to support it. They import everything, and export next to nothing; and there is scarcely an enterprise which can be said to rise to the dignity of an industrial pursuit except the ancient game of PHARAOH.

CLIMATE affords a remarkably thin diet at an altitude of 4,000 feet.

The people on the Rio Grande have no money to invest in any kind of enterprise. They are miserably poor. The people of EL PASO—living in a bake oven of sand, with a public plaza in a state of neglect which would disgrace an Indian village, without any visible means of support—strut about with the pomposity of peacocks, eliminating gas about the grandeur of the city.

VINEYARDS.

The arable land of this valley, is, as we have shown, admirably adapted to agriculture, but most perfectly to the grape. Those experienced in the cultivation of the vine, report that all the conditions of the soil—humidity and temperature—are united here to produce the grape in the greatest perfection. The soil, composed or disintegrated matter of the older rocks and volcanic ashes, is light, porous and rich. The frosts in the winter are just sufficiently severe to destroy the insects without injuring the plant, and the rain seldom falls in its season when the plant is flowering, or when the fruit is coming into maturity and liable to rot from exposure to humidity. As a consequence of these conditions, the fruit, when ripe, has a thin skin, scarcely any pulp, and is devoid of the musky taste so frequent with American grapes. Yearly new vineyards are coming into bearing, counting their vines by the thousand, while the production of wine is becoming annually more and more an article of commerce and profit. Here may be found, and often in great perfection, both the light white and red wines of the Rhine and Bordeaux, and the heavier Burgundy, port, sherry, and, with sufficient age, even a good Madeira, with a grape acclimatised by two hundred years of cultivation, unexcelled for richness and lusciousness of flavor, always free from blight and disease of every kind, so destructive to European vineyards, so fatal to wine growing on the Atlantic slope, and often so damaging even to California. With a soil and water as rich as that of the Nile, with an abundance of water for irrigation, and with sunny days and dewless nights, increasing in strength as the summer heats increase, the wines of the Rio Grande Valley promise to become as varied and as excellent as those of France, Spain or Italy.

DRIED GRAPES.

There is every reason to believe that this valley will become at no remote day a famous raisin district, perhaps more so than any on this continent. The soil and climate are peculiarly adapted to one of the best varieties of raisin grapes in the world. It is well known that raisins, to possess lasting qualities and best flavor, must be dried in the sunshine, then passed through the sweating process, and packed. And there is, perhaps, no place in America where the climate will so certainly and readily admit of this process as here; because at the period of closing the labors of the vineyard, the atmosphere is perfectly dry and clear, with scarcely a cloud upon the horizon for months. The best raisin in the world is made from the Muscat grape, and is cured and packed in just such an atmosphere as this. Our grape, and the raisin industry that will certainly grow out of it, should attract the attention of those skilled in this art.

COST OF A VINEYARD.

The Rio Grande Valley offers great inducements to all who are contemplating a change of residence from the Northern, Middle or Eastern states to a more congenial climate, with the intention of engaging in wine and fruit growing. As all such will doubtless wish to know something of the cost of planting and taking care of a vineyard until it comes into bearing, the following fairly accurate table of expense from the planting to the third year, when the vines will yield their first paying crop, will prove of interest.

Take 20 acres as a basis from which to calculate, for that amount of land is about all one man can attend to properly, and if he does the labor alone, which he can well do, the cost will be merely nominal outside of the cost of the land cuttings.

The income of a twenty acre vineyard when in full bearing will be sufficient to support a family comfortably.

FIRST YEAR.

Cost of land (20 acres) with water right....	\$500.00
Plowing and harrowing \$2.50 per acre.....	50.00
17,000 cuttings (California), \$5.00 per m.....	85.00
Planting cuttings, \$3.00 per acre.....	60.00
Irrigating twice, \$2.00.....	40.00
Cultivating vineyard four times at \$1.00 each	80.00
Hoeing twice at 50 cents.....	20.00
First year's expenses total.....	\$835.00

SECOND YEAR.

Pruning \$1.00 per acre.....	\$20.00
Irrigating twice \$2.00.....	40.00
Plowing vineyard twice \$3.00.....	60.00
Cultivating twice \$1.25.....	25.00
Hoeing twice at 50 cents.....	20.00
Second year's expenses total.....	<u>\$165.00</u>

THIRD YEAR.

Pruning \$1.00 per acre.....	\$20.00
Irrigating twice \$2.00.....	40.00
Plowing twice \$3.00.....	60.00
Cultivating twice \$1.25.....	25.00
Hoeing and suckering twice.....	20.00
	<u>\$165.00</u>

SUMMARY.

Cost first year.....	\$835.00
Cost second year.....	165.00
Cost third year.....	165.00
Total.....	<u><u>\$1,165.00</u></u>

The third year the vineyard will produce at least two tons of grapes to the acre, or 80,000 pounds from the 20 acres, which are worth 2 cents per pound. (El Paso shippers paid 3 and 4 cents per pound last season.) This is a moderate estimate both as to quantity of grapes that a well taken care of 20 acre vineyard will produce the third year and the price that can be obtained from the shipper. For a number of years the vineyard will increase in quantity of grapes each year, till it reaches 5 to 8 tons to the acre.

A bearing vineyard three years to five years old on good land will be worth, and would sell for, from \$300.00 to \$500.00 per acre. It is a profitable business to plant a vineyard, and it is an industry that can never be overdone in this valley.

It was the first labor which Noah and his sons engaged in when they came out of the ARK.

AGRICULTURE AND HORTICULTURE.

The valley of the Rio Grande, (latitude 28° to 34° N.), affords all the requisites, and therefore is well adapted to the delightful and profitable pursuits of the agriculturist and horticulturist. Indeed, it has become a fact abundantly and perfectly demonstrated.

To attain great perfection, and to achieve the most considerable degree of success in these pursuits, favorable conditions of both soil and climate must be found. We claim that those conditions exist here to as great, if not greater, degree than can be found elsewhere on this continent. Nearly all the products of the temperate zone can be produced here in abundance and perfection. The cereals, wheat, corn, oats, barley, rye, etc., yield as much per acre, and of as good quality, as in any part of the United States.

The grasses—alfalfa, millet, timothy, bermuda, and all others which have been thus far introduced, do well. The Smyrna millets, grown here for the first time last year as a test, in small quantity, and under the most favored conditions, attained a growth, in two cuttings, of ten feet. It is estimated that it will yield from three to four tons per acre. This is a perennial of vigorous root and growth, spreads rapidly, runs deep, and is, therefore, well adapted to our soil.

Alfalfa does remarkably well. May be cut from three to four times each season, aggregating four or six tons per acre, and two to four feet in height. This is also a perennial, with a vigorous growth of root, penetrating to as great a depth as thirteen feet, showing great adaptability to a dry climate. From present appearances, it would seem that this is destined to be the staple grass crop of the valley. It is very productive, hardy and tenacious of life, the best of food for cattle, horses, hogs and chickens, and has already become quite an important and remunerative industry.

Bermuda grass, wherever planted, indicates its love for this soil and its determination to stay. Its myriad rootlets permeate the soil and form an almost impenetrable sward. It is peculiarly adapted to lawns, parks, etc., and fills exactly that much-needed and desirable quality here.

Vegetables of nearly every known class and variety, and especially all those that are grown on vines, such as the melon, squash, pumpkin, etc., do as well here, in all respects, as in any part of the United States. The Rio Grande onion is already justly famous above all others.

Under the head of POMOLOGY, it may be said that this soil and climate are perfectly adapted to the growth of apples, pears, peaches, plums, apricots, grapes, quinces, nectarines, almonds, pecans, prunes and many others, such as strawberries, raspberries, gooseberries, too numerous to mention. All of these have been thoroughly tested; in fact, it is no longer a matter of experiment with any of them. They can be produced in the valley of the Rio Grande in abundance and perfection.

While adapted to the growth of all kinds of grapes, the old "Mission grape," of dark purple hue, widely known now under the name of the "El

Paso grape," is grown here in great perfection, and is a very superior grape for the table and for the manufacture of wine, brandy and raisins. An acre with one thousand good vines is worth \$1,000. A large quantity of these grapes (some 10,000 baskets), will be shipped this year to Eastern markets, yielding no doubt a satisfactory remuneration.

The superiority of soil and climate for the growth of fruit is further shown by the fact that trees of the staple fruits, such as apples, pears and peaches, set out only two years since, are now bearing.

Flowers and shrubs of all kinds find here a natural and congenial home. The alkaline soils can be utilized by growing any of the great varieties of the sugar beet, to which these soils seem singularly adapted. The cabbage and onion also thrive just as well in such soils; and in a few years of such cultivation, especially if manure is used, the alkali will be absorbed, and the land found suitable to the growth of anything grown elsewhere in the valley.

Small farms for the individual are preferable to large ones, unless there be a community of interest in all the people of a settlement. The land can be doubly cropped each year, so that one acre here answers as well as two elsewhere. Every acre can and should be made a perfect garden.

INDIVIDUAL INDUSTRY.

Individual industry can avail nothing in the valley of the Rio Grande. A man with his family may starve to death without water for irrigation. "Paul may plant, and Apollus may water; but God gives the increase."

The American's God MONEY must be spent on the Rio Grande in great abundance before there can be any revénue.

WHEAT AND CORN.

If only one-fourteenth part of the territory of the Republic of Mexico were used for the raising of wheat and corn, the annual yield would be about 110,000,000 bushels of wheat and 400,000,000 bushels of corn every year; and this immense yield would all be available for foreign markets, as the outlying lands have always raised enough for home consumption. Besides, the Mexicans are from choice a corn-eating people. Seven-eighths of the population live on tortillas (hoecakes).

Nevertheless, the tillage is all done with tools as ancient as Abraham — wooden sticks, the crotches of trees shod with iron. Yet, an investigation of yield and quality makes one wonder!

THE MAGUEY.

Besides these staple crops, a glance at some of the uncommon products of Mexico may not be uninteresting. Nobody can have much of an opinion of the cactus family as a thing of beauty or as a source of wealth. In some parts of Mexico the cacti assume gigantic proportions and grotesque forms. One member of the family is essential in daily life. The agave, aloe, maguey, or century plant, exists in some thirty varieties and has more products than any other vegetable. It produces in enormous quantities *pulque*, the national beverage. 250,000 pints of this are consumed daily in the city of Mexico alone. Each plant produces about 125 quarts of this juice, after which it dies. In other localities no juice or pulque is drawn from the plant, because its special virtues enable it to produce the brandy known as "Tequila," from the locality on the Mexican Central where the best is produced. The mode of making this is as old as the Aztec civilization. After the pulque has been extracted the plant still possesses its greatest value. It can be made to yield an excellent quality of molasses, superior to that yielded by the sugar cane. Still, the most valuable product is the fibre yielded by the leaves, equal to the best jute. Where soil and locality do not admit of this use of the plant, it yields a pulp unequalled for making paper, cordage, matting, etc.

THE RAMIE PLANT.

India is the original home of this plant, to which the climate and soil of the Rio Grande are especially favorable, though it will grow wherever cotton will. Once planted, it is perennial for many years, and requires little cultivation or attention. It is not subject to destruction by worms and insects, and is cut four times a year. The fibre is stronger and finer than flax or cotton and is considered for most purposes equal to silk. Each cutting yields as many pounds per acre as cotton does.

The India ramie, bleached, combed and made ready for the spinners, brings in England about fifty cents per pound. This product must bear a prominent part in the commercial future of the Rio Grande.

THE CASTOR BEAN

grows spontaneously and abundantly along the coast regions, though these are not the most favorable localities for its profitable cultivation. The plant yields the first year, and for about six months of the year, and the same plant lives and bears for about ten years, when it requires replanting. An acre of trees yields about 3,600 pounds of beans, or 1,800 pounds of oil.

TOBACCO.

It is not generally known that Mexico has been for many years a producer of tobacco of flavor which compares favorably with the best Havana. It must soon become an article of considerable value as an export, as, under the present condition of things, tobacco is produced in twenty-two of the twenty-eight States, and produces, as an export, more than \$2,000,000 annually.

SUGAR.

The plant, once made, stands from ten to thirty years. It is under inefficient cultivation, but yields one-third to one-half more per acre than the island of Cuba. Nearly all the Mexican States produce it in greater or less quantity, and yet the present supply is inadequate to the enormous local consumption, and sugar brings a higher price than in the United States.

COFFEE.

In some localities the coffee plant demonstrates its adaptability to the climate by growing wild. Its best locality is about 3,500 feet above the sea, which indicates a wide range of territory. At that elevation it yields about three pounds to the plant. The elevation of the Rio Grande Valley is about 4,000 feet and the climate similar to Arabia, where Mocha coffee grows.

Mr. Foster, late Minister to Mexico, stated in one of his reports that its quality was equal to the best known in any country, and that Mexico possessed in her coffee a far greater wealth than in her silver.

It is reliably stated that there are coffee plantations in Mexico that have annually borne for three-quarters of a century, without replanting.

In 1882 the amount paid by us for coffee was a little more than \$46,000,000, of which nearly \$30,000,000 went to Brazil.

COTTON.

This is one of the most ancient of the products of Mexico, and was raised, spun, woven and dyed in brilliant colors by the Aztecs. Like all other products of this favored clime the production bears no relation to the capacity of the country.

The average yield per acre is about fifteen per cent. more than in the United States. The cotton consumption is so prominent a factor in the calculations of the world's trade that it is useless to present again here familiar figures. It grows luxuriantly on the Rio Grande.

TROPICAL FRUITS.

These grow here in immense profusion and variety. Oranges, limes and bananas are standard articles of consumption and trade, and the construction of railways renders their limitless supply an important item. Several kinds of refrigerating cars are an undoubted success. The fruit trade from California, in varieties which are mostly produced in all the States, is enormous. There is, in the near future, an immense development in the tropical fruit business; fresher, cheaper, of greater variety and better quality, than we have ever been accustomed to. In the West Indies there is nearly a level surface of land. The crop per annum is a single one. In Mexico, one district has ripening fruit at one season of the year and another district later or earlier. Around the city of Mexico, in addition to a list of tropical fruits whose names, variety and deliciousness are a revelation to the stranger, strawberries, new potatoes and green corn may be had every month of the year.

GRAZING.

The millions of acres of nutritious grasses, embracing a large part of Northern Mexico, extending north-east to the Rio Grande, are attracting the attention of foreign cattle-raisers, and already steps are being taken for the utilization of this vast grazing ground.

The recent Act of Congress, prohibiting *aliens* from holding lands or mines in the Western Territories, has brought the influx of foreign capital to a sudden stop; and it must, perforce, overflow into Mexico. Moreover, lands and mines are held by a safer tenure than in the United States, and the protection of the government is *infinitely superior*. Agrarians, Anarchists and Squatters are summarily shot, and a land-owner in Mexico is *lord of the soil*.

The recent legislation by the Mexican republic favorable to the United States and foreign investments is of the greatest importance in mining circles. It must be remembered that in this marvelously rich mineral district are mines which have already produced, according to the records, as proven by their system of taxation upon all mines, fabulous amounts of gold and silver. One, the Valemciana, at Guanajuato, has yielded \$1,500,000,000. At Zacatecas are others of extraordinary value, and at this place an English syndicate has recently purchased properties for which millions were the purchase price. Capitalists from eastern cities have eagerly sought for investments, and Chicago always to the front when great opportunities are presented, should not lag behind now.

TRANSLATION.

In the year 1715 a resident of Calaya commenced work on a virgin gold mine in the old mineral district of "San Juan de la Chica," naming the place he developed Los Margaros. The mine was subsequently sold to Don Gerracio Prado, a farmer living in the vicinity. At his death in the year 1809 the mine was producing three ounces of gold to the cargo of 250 pounds. Owing to the imperfect method of working—Don Gerracio being a farmer and not a miner—the mine caved in and was abandoned until 1830, when Don Dario, a brother of the former owner, attempted to recover the lost shaft, but a lack of funds prevented. For fifty-seven years the mine was undisturbed. Don Luis Prado, a nephew of Don Gerracio, was well informed of the place which had been worked, but would not reveal it because his price was too great for the secret of the lost mine. This tradition was the basis on which the subsequent owners went to work to discover the mine which in former years was known to be so fabulously rich in gold. In May, 1883, they located this same mine and commenced the work of development. They succeeded in finding the old shaft indicated by notched sticks and primitive tools with which the former owners worked. These parties have endeavored to develop the property sufficiently to induce capital to join the enterprise. In May, 1887, a representative of the "San Juan de la Chica" visited Chicago and interested a syndicate to examine the mine. Mr. H. V. Reed was selected of the number to go to Mexico and report.

WHAT HE FOUND.

The main body of ore was full ninety feet in width between walls, and at a depth of seventy-five feet the ore assayed from \$7 to \$180 in gold, besides silver. An average assay, inch by inch, for fourteen feet went \$39 in gold and \$16 in silver. On the above showing the mine was purchased and a company organized in Chicago. Since its purchase the company have vigorously prosecuted the work, and an able attorney, together with a competent engineer, has been sent to perfect titles and to prepare the way for extensive machinery. At a depth of 125 feet they find from assays made at the state department in Guanajuato the average value to be in gold \$66 and in silver \$12 per ton.

BUILDING MATERIAL.

Brick.—At the writing (1887), brick are selling at a lower figure than in any other important point in the United States. Good building brick which are quoted in Chicago at \$9 per 1,000 are selling here for

\$8 delivered on the ground. The best pressed brick bring \$20 per 1,000, which is about one-half the cost of the same material in any of the Northern or Eastern cities. Brick were first manufactured in El Paso in 1881, 2,000,000 being made in that year. This number was increased to 10,000,000 in 1886.

Lumber.—Framing lumber now quoted in Chicago at \$29 per 1,000 feet is selling in El Paso at \$25, and finishing lumber brings \$50. Redwood shingles sell for \$5, and doors, sashes and blinds are sold at very low figures.

Stone.—There are extensive stone quarries in Franklin Mountain, and building stone costs only \$2 per perch ($16\frac{1}{2}$ feet) laid in the wall. At Marfa, on the Southern Pacific Railway, there is an extensive deposit of a peculiar white stone which cuts easily in the quarries, but grows harder and harder the longer it is exposed to the action of the atmosphere. This stone can be brought to the city at a very small cost, and the buildings constructed of this material are fully as beautiful as they would have been if built of marble. Granite and red sand stone are found in abundance, and slate of a superior quality has lately been discovered.

Lime.—There are numerous lime kilns in the valley, and lime sells for only 40 cents per bushel, which is much cheaper than it can be procured elsewhere. Cement and other building material are proportionately low in price.

THE CLIMATE.

This climate cannot be excelled for its sanitary qualities. The mercury has rarely been noted below 20° above, and then only for a few hours at a time. Snows seldom whiten the ground, and lie but a few hours. Damp, chilly days, and hot, sultry nights are unknown. The heat of summer is not oppressive, and sunstroke has never been known. The sky is clear the year round. No entire day has been known when the sun and stars have not been seen. The atmosphere is unsurpassed for its dryness and purity; full of electricity, it is wonderfully exhilarating, and never burdened with malarious or poisonous exhalations. Blankets or cover of some kind are necessary on nights which follow the hottest days, because the nights are always cool, though not damp. Sleeping with doors and windows open, or in the open air, may be practiced with impunity. The asthmatic invalid or the consumptive may sit out of doors, ride or walk in the sunshine 350 days in the year with pleasure and comfort, and may always enjoy refreshing sleep at night, thus securing the most essential conditions for the restoration of a shattered nervous system and broken constitution.

Free and full breathing of pure air is most important for a sufferer from diseases of the liver and lungs. Make such a person breathe and he will live; whatever makes him breathe faster makes his blood flow more rapidly, and be better aerated. His appetite will increase, digestion and assimilation will respond to the increased action of the lungs, which is secured by the elevation of this valley. Here one must breathe more fully and more rapidly than nearer the sea level, and its air is as pure as any on the face of the earth. A permanent increase of breathing capacity, caused by rarefied air, prevents the formation of tubercles, and often heals those already formed. At this elevation (4,006 feet) this increase is not so great as to be injurious, as is sometimes the case at higher elevations. Such are some of the conditions which give to this valley an extremely healthy and invigorating climate, free from the malaria of the hot, damp regions of the river beds and low lands of the Southern States, and from the mountain fevers, colds, influenzas, asthmas and consumptions of the higher ranges of the Rocky Mountains, and cold, fog-bound regions of the Northern States. A more desirable climate cannot be found the world over. Persons shut out from the light of the sun are most disposed to consumption. For such, daily sunlight is everything. This country has more sunny days than any region of the United States, probably more than *any* in the world, and the invalid, therefore, cannot but enjoy that benefit, unless he purposely excludes himself from it.

ARTESIAN WELLS.

The problem of obtaining water by artesian boring will not be discussed here on account of its inutility.

An experiment was made by the government of the United States as long ago as 1857 near the Pecos River, Texas, under charge of Captain (afterwards Major-General) Pope, which resulted in failure, and subsequent experiments on these high plateaus have not been successful—therefore the subject is dismissed as foreign to the matter under consideration.

COMMON WELLS.

Raising water by hand sweeps may do very well for Chinamen, and the Noria or Persian wheel may answer the Mexican's indolent needs, but they are also denied the importance of serious consideration;—and there is no fuel in the valley of the Rio Grande for steam power, even if that were practicable.

FINANCIAL.

This statement is offered for the consideration of serious men who have capital to place; and it is confidently believed that a safer and more profitable investment cannot be made.

Beyond all doubt the waters of the Rio Grande, north of the Mexican boundary, belong to the United States; and are subject to "*appropriation*" according to law by any person or persons, corporation or municipality having the enterprise and means to utilize them; and it follows as a natural sequence that the water will belong to its owners.

The annual income of a Company completing this great enterprise will continue "*as long as water runs and grass grows.*"

In addition to the income from the water there are hundreds of thousands of acres of waste land in the valley of the Rio Grande belonging to the government, municipalities and individuals, which can be purchased for five or ten dollars per acre, which will be worth *and sell for* ten times the cost, upon the completion of the canal.

It is proposed to take the water out of the Rio Grande in New Mexico, far North of the boundary line between the United States and Mexico, so there can be no international complications.

The water will then be conducted along the Western slope of the Organ Mountains, affording means for working the mines known to exist there, and for irrigating the Mesilla Valley.

The canal will be conducted in the ancient bed of the Rio Grande between the city of El Paso and Mount Franklin, and if any water is left, it will be sold to the use of the City of El Paso; and for the purpose of irrigating the wide valley lying between El Paso and the present site of Fort Rice (60 miles), where the valley closes in.

A company was organized by the undersigned ten years ago under the laws of the State of TEXAS (with a subsidy of an enormous land grant; *which has since been revoked*), but the general incorporation laws of the State of TEXAS are not encouraging to foreign corporations.

The laws of the Territory of NEW MEXICO are exceedingly liberal; and are equal in legal sense to the statutes of the United States. The laws of the State of MISSOURI in regard to corporations seem to have been drawn from mediæval ages.

The general incorporation laws of the State of ILLINOIS leave nothing to be desired by an honest corporation. An abortion of an enterprise may be started with two or three hundred thousand dollars; but from the best intelligence that can be obtained, it will require at least

ONE MILLION dollars to construct and equip the canal, and to purchase sufficient land to reward the undertaking. Nothing can be expected in the way of subsidy from the great state of Texas, and less than nothing from the city of EL PASO; *the Government of the United States was not organized to construct irrigating canals.*


The enterprise is submitted on its MERITS, and the undersigned would be pleased to receive overtures from solid men who are seeking a solid investment, and to grant an audience on proper application; but *no personal solicitations will, under any circumstances, be made.*

Respectfully,

CHARLES D. POSTON,

153 MONROE STREET,

CHICAGO, ILLS.

1521 J. H. A.W.
Washington

D.C.

Oct. 21. 1881

Wm. H. H. H.

5/10

GAYLAMOUNT
PAMPHLET BINDER



Manufactured by
GAYLORD BROS. Inc.
Syracuse, N. Y.
Stockton, Calif.

